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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,956	11/17/2003	Michael D. Goodner	42P17286	4445

8791 7590 09/16/2005

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EXAMINER

NGUYEN, THANH T

ART UNIT PAPER NUMBER

2813

DATE MAILED: 09/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/715,956

Applicant(s)

GOODNER ET AL.

Examiner

Thanh T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 13-15, 18, 20 and 23-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-15, 18 and 20 is/are allowed.
- 6) ☒ Claim(s) 1-4 and 23-25 is/are rejected.
- 7) ☒ Claim(s) 26 and 27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 6/27/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed on 6/27/05 have been fully considered but they are not persuasive.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 23-25 are stand rejected under 35 U.S.C. 102(e) as being anticipated by Chae et al. (U.S. Patent Publication No. 2005/0029229) as previously applied.

Chae et al. teaches a method comprising: determining a dry etch rate of a sacrificial, light absorbing material(SLAM) (104) and of an interlayer dielectric (ILD) material (103) (see paragraphs# 23-24);

comparing the dry etch rate of the ILD material with the dry etch rate of the SLAM (see paragraphs# 25);

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altering (selectivity/(dyed sog/sop)) the composition of the SLAM by altering the carbon to silicon ratio of the SLAM (see paragraphs# 45+, noted that during the plasma etching of the SLAM, the hydrofluorine carbon gas reacts with SLAM that changes the carbon to silicon ratio. Therefore, the Si-CH<sub>3</sub> bond in the SLAM material is breaking up during the plasma etching that changes the plasma etching rate) to provide a changed dry etch rate for the SLAM (see paragraphs# 23-25) such that the dry etch rate of the altered SLAM is approximately equal to the dry etch rate of the ILD material (see paragraphs#45+).

Regarding to claim 2. altering (dyed) the composition of the SLAM increases its dry etch rate(see paragraphs# 23).

Regarding to claim 3, altering the composition of the SLAM decreases its dry etch rate (see paragraph# 23).

Regarding to claim 4, 25, the SLAM comprises a polymer-based material (SOP, see paragraph# 24).

Regarding to claim 23. A method comprising: altering the composition of a SLAM by adding a fluorine-containing additive (CF<sub>4</sub>, see paragraphs# 45+) to provide a changed dry etch rate for the SLAM such that the dry etch rate of the altered SLAM is approximately equal to the dry etch rate of the ILD material (see paragraphs#45+)

forming a via opening(107, figure 1c) in a layer fabricated from the ILD material;

filling the via opening with the altered SLAM (104, figure 1d); and

etching a trench approximately centered on the via opening such that the ILD material and the SLAM etch at the same rate (see figure 1f-1H).

***Allowable Subject Matter***

Claims 13-15, 18, 20 are allowed. Because none of the prior art teaches altering the composition of the SLAM by introducing carbon in a cyclic or a cage form to increase or decrease the etch rate such that the etch rate of the altered SLAM matches the etch rate of the dielectric material.

Claims 26-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Because none of the prior art teach the combination of altering the composition of the SLAM by adding a fluorine-containing additive of low molecular weight polyvinylidene or perfluoropolyether.

***Response to Arguments***

Applicant's arguments filed on 6/27/05 have been fully considered but they are not persuasive.

Applicant contends that Chae et al. does not teach altering the composition of a SLAM by altering the carbon to silicon ration of the SLAM, and altering the composition of a SLAM by adding a fluorin-containg additive. In response to applicant that Chae et al. clearly teach altering the composition of a SLAM by altering the carbon to silicon ration of the SLAM, and altering the composition of a SLAM by adding a fluorine-containing additive (see paragraphs# 45+) during the plasma etching of the SLAM, the hydrofluorine carbon gas reacts with SLAM that

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changes the carbon to silicon ratio. Therefore, the Si-CH<sub>3</sub> bond in the SLAM material is breaking up during the plasma etching that changes the plasma etching rate (see paragraph# 45+).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Nguyen whose telephone number is (571) 272-1695, or by Email via address Thanh.Nguyen@uspto.gov. The examiner can normally be reached on Monday-Thursday from 6:00AM to 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached on (571) 272-1702. The fax phone number for this Group is (571) 273-8300.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956 (See **MPEP 203.08**).

A handwritten signature in black ink, appearing to read 'Thanh', with a stylized flourish extending from the end.

Thanh Nguyen  
Patent Examiner  
Patent Examining Group 2800

TTN